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Werner Gumpel*

Energy Policy Constraints and Perspectives in Russia

Once one of the world's most important energy producers, Russia is increasingly incapable of maintaining energy supplies to its industries and private households. However, the crisis in the energy sector has also become an ecological crisis. What chances are there for finding a solution to this double crisis?

Economic breakdown in the states which emerged from the former USSR has also led to a dramatic fall in energy production. This decrease, which began as early as 1989, affects oil and coal in particular, although natural gas production is also on the wane. For 1994, Uzbekistan alone has posted production increases in all areas of the energy sector. While Russia (RSFSR) extracted almost 547 million tonnes of crude oil in 1980, the figure in 1994 was just 318 million tonnes. A further decrease to 300 million tonnes is expected for 1995. Natural gas production had been rising up to 1991 and had reached 643 billion cbm in that year. In 1994 it stood at just 607 billion cbm. Coal extraction fell from a peak of 395 million tonnes in 1990 to 271 million tonnes in 1994.¹ At the same time, energy demand is forecast to rise by 400 million units of coal equivalent during the next five years, almost a third of Russia's current energy consumption.²

This is a gravely serious situation for the Russian economy. Once one of the world's most important energy producers, this country is increasingly incapable of maintaining energy supplies to its industries and private households. Bottlenecks arise which lead to temporary power cuts and losses of production. Particularly critical are supplies of all kinds of oil products to industry, especially petrol and diesel fuel.³ In a number of regions, the numbers of sick rose during the winter as a result of insufficient heating facilities. The critical state of the Russian economy is aggravated still further by insufficient deliveries of primary and secondary energy, and the process of transition - which is already stuttering - is slowed down still further.

Energy resources - i.e. oil and natural gas - were the former Soviet Union's most important export goods. In 1985, it earned almost half of its freely convertible foreign currency through exports of oil and oil products alone. Oil and natural gas accounted for between 60 and 65 percent of Soviet exports. Although exports to the industrialised countries of Western Europe have not yet been reduced, they can only be maintained by clearing the domestic market and by reducing deliveries to the former CMEA member states. As far as the former CMEA member states are concerned, the reduction of Russian supplies and the change to dollar payments present a severe burden to economic reconstruction. With an eye to its foreign currency requirements, the Russian government feels economically compelled to increase oil exports to between 95 and 97 million tonnes in 1995, despite falling extraction volumes.⁴

Developments related to Russia's economic decline and the transformation process have led to oil becoming popular with smugglers. Hundreds of thousands of tonnes are exported illegally, thus depriving the country's own economy, and the money earned either remains abroad or is transferred abroad and so is not available for the reconstruction of the economy. In this way, the overexploitation of oil resources which has been going on for decades is

¹ Cf. H. Clement: Die Energiewirtschaft der GUS, in: Arbeiten aus dem Osteuropa-Institut München, No. 151, March 1992, pp. 9 and 10; *Ekonomika i zisn*, No. 17, April 1995, p. 43; and *Finansovye Izvestija*, 25.8.1994.

² Cf. V. Vasilev, B. Davydov, A. Ljutenko, L. Chirilev: *Strategija ispol'zovanija energoresursov*, in: *Ekonomist* (Moscow), No. 12/1994, p. 6.

³ V. Tjukov: Die erdölverarbeitende Industrie Rußlands und die Aufgaben ihrer Modernisierung (in Russian), in: *Ekonomist* (Moscow), No. 10/1993, p. 20.

⁴ *Finansovye Izvestija*, 25.8.1994.

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stepped up still further, causing immeasurable damage to the national economy. Privatisation measures in the oil industry seem to be encouraging rather than hindering this development. The liberalisation of oil exports as from January 1, 1995, when all restrictions on oil exports were lifted,⁵ has had the same effect.

Falling Investments

Investments in the energy sector have been falling for years, contributing to the high proportion of antiquated production capacity. More than half of the equipment used in the coal industry and 30 percent of plant used for gas extraction requires renewal. More than half of the equipment used in the oil industry has suffered 50% wear and more. The degree of wear in the oil processing industry runs to more than 80 percent.⁶ The Russians are not managing to invest enough in new plant and equipment to compensate for the "natural loss" of production capacity. This is not only true of oil and coal production, but also of the electricity industry where up to 60% of plant and equipment must be replaced or generally overhauled by the year 2000.⁷ Construction of new production capacity is lagging a long way behind the rate of wear on existing plant. In other words, depreciation is considerably higher than investment, with no replacement investments being carried out. These resources are diverted for use elsewhere in the state budget. In the natural gas industry, even sharper declines in production are only avoided by using the financial resources earmarked for new investments in order to help maintain current production, i.e. largely for repairs, etc.⁸

Russia's energy sector is pinning its hopes on Western investments and loan capital, since an increase in oil and gas extraction figures is only possible with extensive investment in the modernisation of the country's completely dilapidated plant and equipment – investment for which Russia itself lacks the necessary capital. Economic and political instability, however, bureaucratic procedures and administrative impediments, very high taxation on profits, a lack of financial and legal guarantees, and a

frequently evident inclination of the state to maintain its control over oil deposits all do little to encourage foreign investors to take the hoped-for steps.⁹ Furthermore, the mightiest Russian oil companies "LUKoil" and "Surgutneftegas" are fighting any foreign "intrusion" into Russia's oil and gas business. Injections of foreign capital are therefore relatively limited. With Western help the Russian government nevertheless hopes to stabilise annual oil production at 325 million tonnes by the year 2010 (!)¹⁰ This is the minimum amount necessary to satisfy Russian requirements and bearing in mind that many of the country's power stations are oil-fired, the supply of electricity to businesses and households is also dependent on this target being reached. Achieving a production volume of 350 million tonnes would require plant modernisation costing more than 50 billion dollars up to the year 2000.¹¹

Subsidies

Almost every area of the Russian energy sector operates at a loss and can only survive with the help of massive subsidies. This is true not only of the coal mining industry, which also costs the German economy huge sums of money, but also of the oil and gas industries. Subsidies of 6.3 trillion rubels (approx. 1.26 million dollars) are earmarked for the coal-mining industry in the Russian Federation's state budget for 1995 alone. In fact, however, 14 trillion rubels (approx. 2.8 million dollars) would be necessary to maintain production at the current low level.¹² In addition, huge losses to the national economy are caused by a variety of accidents. Accidents in Russian coalmines occur much more frequently than in Germany or the USA,¹³ the oil and gas pipelines are probably unique in their poor state of repair – with all the consequences one could expect. Modernisation, however, and the rationalisation involved in the modernisation process would mean laying off workers and so increasing the level of unemployment, which is already rising steadily. Initially, therefore, the 43 most dangerous and least economical coalmines are to be closed down. A further hundred are to follow.¹⁴ These are mines with monthly productivity levels of 7 to 25 tonnes per

⁵ Izvestija, 6.1.1995.

⁶ Finansovye Izvestija, 23.3.1995.

⁷ Izvestija, 19.4.1994.

⁸ Cf. A. Troizkij: Energetika Rossii: Problemy i perspektivy, in: Ekonomist (Moscow), No. 2/1994, p. 27; on the state of the Russian oil and gas industries see A. Fischer: Die Folgen jahrzehntelanger Mißwirtschaft in der Erdöl- und Erdgasindustrie der ehem. UdSSR, in: Osteuropa-Wirtschaft, Vol. 38, No. 3/1993, pp. 240 ff.

⁹ Finansovye Izvestija, 16.6.1994; and Izvestija, 6.12.1994 and 2.2.1995

¹⁰ Moskovskie Novosti, No. 64, 18-25.12.1994, p. 30.

¹¹ Moskovskie Novosti, No. 42, 18-25.6.1995, p. 27.

¹² Finansovye Izvestija, 7.2.1995.

¹³ Izvestija, 26.5.1994.

¹⁴ Finansovye Izvestija, 4.5.1995.

worker¹⁵ (average monthly production per worker in Russia: 35 tonnes; in Germany's Ruhr area mines: 170-180 tonnes). However, given the already high degree of social tension which is characterised by rising levels of open and hidden unemployment, these measures will be delayed for as long as possible.

Demand for coal in Russia is currently falling as a result of a general decline in effective demand. With takers of Russian coal refusing to pay their coal bills, the mines are unable to fulfil their obligations towards the workforce which, as a rule, have to wait months for their wages and often have to force payment by going on strike.¹⁶ This situation leads not only to a further decline in productivity levels, but also to urgently needed replacement investments being neglected as a result of the lack of necessary financial resources. This, in turn, leads to falling safety standards in the mines and so to accidents and losses of production. Russia's coal mining industry is characterised by a downward spiral of decline which will also affect the country's electricity industry.

Ecological Effects of the Energy Crisis

All in all it is fair to say that Russia's energy sector is going through a deep crisis. This is true of all areas of the sector, whereby the natural gas industry, as was mentioned in another context, is the only branch to have so far managed to limit the decline in production to a relatively small scale. The overexploitation of resources and the failure to renew production capacities, as well as the indifference of the energy sector workforce and management, have led to severe ecological damage which is not only evident in the catastrophic level of safety standards in the coal-mines, but also in the lack of safety in the pipeline networks. By the year 2000, more than 35,000 km of

corroded or poorly laid pipelines, complete with their entire gas throughput installations, will have to be replaced because they are endangering large areas of the country.¹⁷ "Where there are pipelines there are accidents", read the title of a report in the *Izvestija* newspaper on two broken pipeline incidents which occurred almost simultaneously in the Tyumen area.¹⁸ Russia's press reports on broken pipelines and their consequences almost every week. These often result in large expanses of land being flooded with oil or, in the case of gas pipeline explosions, in the loss of human lives. The West pays attention to but a few of these disasters. "Natural gas and oil pipelines explode, burn and destroy the environment almost every day." In Russia, they are paid hardly any attention because they are such common occurrences.¹⁹ In general, measures for clearing up the damage are either not implemented at all or are otherwise highly inadequate. Criminal elements often tap pipelines with a hammer and chisel in order to steal crude oil or (in the case of product pipelines) oil products. The leaks which are created in this way are not sealed and represent a further source of pollution.

These disasters represent not only an unimaginable strain on the environment, but also the destruction of irretrievable resources. Thousands of tonnes of oil from leaky pipelines seep away into the ground without anything being done to prevent it. There is neither enough money available to repair the faulty

¹⁵ *Finansovye Izvestija*, 7.2.1995.

¹⁶ *Finansovye Izvestija*, 7.2.1995.

¹⁷ Cf. A. Fischer: Produktionsrückgang in der Erdgasindustrie Rußlands, in: *Osteuropa-Wirtschaft*, Vol. 39, No. 3/1994, pp. 201 ff; here p. 208.

¹⁸ *Izvestija*, 28.12.1994.

¹⁹ *Izvestija*, 28.4.1995.

Bernhard Fischer (ed.)

Investment and Financing in Developing Countries

The authors of this reader analyze some of the most pressing themes in the complex inter-linkage of investment and financing in developing countries.

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pipeline system nor does anyone show any great interest in doing so.

A similar situation exists in the electricity industry, even if no great disasters have taken place so far. Here, too, there is a catastrophic proportion of antiquated plant and equipment due to a lack of replacement investments. Accidents are the order of the day. Nowadays, virtually nobody pays for electrical energy from the power stations, which in the Soviet Union was delivered at very low prices; if payments are made then only after long delays. This aggravates the already precarious situation still further. Every year, 1.5 to 2.0 billion kWh are tapped illegally. A number of industrial enterprises use specially developed devices for by-passing official electricity meters. Conversely, the electrical utilities do not pay for the fuels delivered to them such as oil, natural gas and coal. Chaos rules in Russia's energy sector.

Environmental protection measures, such as the installation of smoke filters etc., are impossible under these circumstances. While the state of the oil industry leads to the destruction of huge areas of land, the electricity industry is one of the country's worst air polluters, accounting for 24.7% of industrial emissions (1992 figure).²⁰ Furthermore, it is also responsible or partly responsible for the excessive warming of many lakes, rivers and canals as well as for the death of the country's forests. On average over the last twelve years, 41.5% of the waste water which pollutes Russia's rivers came from the electricity industry.²¹

Insufficient maintenance of the hydroelectric power plants and their reservoirs has catastrophic results. In some cases, repairs have not been carried out for decades. This leads time and again to dam bursts and the consequent destruction of human life, houses and businesses. One example is the disaster which took place in August 1994 in Tirljanskiy, in the Federal Russian state of Bashkirskaya. More than 150 houses as well as streets, a railway track and power lines were destroyed. More than 70 people were killed. The plant had not been repaired for thirty years.²²

While Russian experts also recognise the damage being caused to the environment by the energy sector, no countermeasures are being undertaken. Energy experts recommend the promotion of energy conservation and economic restructuring, but fail to explain how this can be achieved. They also want to change the structure of Russia's energy mix by extending the use of natural gas – an ecologically clean fuel – whose share of primary energy

consumption is supposed to increase from 39 percent in 1990 to 52 percent in 2010 while oil's share is supposed to fall from 39 percent to 28 percent. Emissions into the atmosphere would fall by around 30-40 percent by the said year.²³ Such demands have often been made in the past – without altering the realities at all. Given the current state of the Russian economy and the prevailing lack of financial capital, it is not to be expected that things will be any different this time. The "soft budget restraints" which have hitherto existed will have to be maintained in order to guarantee the survival of this branch of industry. There are, however, no resources available to finance an ecologically oriented restructuring of the energy sector. One must therefore be thankful if the situation does not worsen still further.

The "International Energy Agency" (IEA) has promised to support the Russian Federation with help and advice on implementing free enterprise principles in the energy sector. Environmental issues will form a major focus of this cooperation, which is to include, *inter alia*, energy conservation, production, extraction, processing, sales and distribution, research and information. Most importantly, the IEA demands of the Russians that they finally begin to think in terms of costs and that they raise energy prices to a level which covers not only production expenditure, but also expenditures incurred in the maintenance of energy infrastructures and in energy delivery.²⁴ Financial transfers, however, are not mentioned, although only such financial support could have any significant effect.

Nuclear Energy

What possibilities are there of finding a solution to this energy sector crisis which has also become an ecological crisis?

A programme drawn up by Russian energy experts pins its hopes on the further development of nuclear energy. Talk is of a "new generation of increased-security atomic reactors" to go on stream "after the year 2000".²⁵ Until then, the nuclear power stations

²⁰ Cf. T. O. Tagaeva: *Ekologiceskaja situacija v Rossii*, in: *Eko* (Novosibirsk), No. 4/1994, p.109. Also details on environmental degradation related to the energy sector in U. Weissenburger: *Umweltprobleme und Umweltschutz in der Russischen Föderation*, in: *Osteuropa-Wirtschaft*, Vol. 39, No. 2/1994, p. 101.

²¹ *Ibid.*, p. 110.

²² *Izvestija*, 10.8.1994.

²³ Cf. A. Troizkij, *op. cit.*, p. 34; *Finansovye Izvestija*, 23.3.1995.

²⁴ *Neue Zürcher Zeitung* and *Süddeutsche Zeitung*, 23.5.1995.

²⁵ Cf. A. Troizkij, *op. cit.*, p. 33.

currently under construction are to be completed and connected to the national grid. These will have capacities of 4-6 million kW. Their safety standards are to be "improved" compared to previous nuclear power stations. At present, 12 first generation blocks are still operating in Russia whose standards fail to meet either international or Russian requirements.²⁶ In the case of the RBMK-1000 and RBMK-1500 reactor types, which are considered the most dangerous, the constructors have not even provided for a programme for shutting down the reactor when it comes to decommissioning the plant. Taking them from the grid would therefore not only cause problems as far as the country's electricity supply is concerned, but would also create technical difficulties.²⁷ Time and again, financial bottlenecks in the Russian energy sector compel the cancellation or postponement of planned repair work. This happened in 13 blocks in 1994.²⁸ By the year 2010, twelve to fourteen blocks with a total capacity of 7-8 million kW will have to be taken from the grid as they reach the end of their operating lives. Taking these circumstances into account, Russian experts expect the country's nuclear power generating capacity to be between 24 and 25 million kW in 2000 (1995: 21 million kW) and 30 to 37 million kW in 2010. The nuclear share of total energy production will increase from 12 to 13-14 per cent,²⁹ a very low proportion compared to France (75 per cent) or the EU average (34 per cent).

Assuming that this programme can be realised, it would mean further nuclear power stations going on stream. There is little hope of their having higher safety standards than those currently in operation. Even if it were possible to improve these standards, the human factor, which was the direct cause of disaster at Chernobyl, would remain. Given the poor training and above all the indifference of nuclear staff in Russia, further disasters of this kind cannot be ruled out. As far as the further development of nuclear energy is concerned, Russia is pinning its hopes on assistance from the industrialised countries which, in view of the global dangers emanating from Russian nuclear plants, are under pressure to act.

²⁶ *Finansovye Izvestija*, 25.5.1995.

²⁷ Cf. S. Comes: *Die Kernkraftwerke in der früheren UdSSR und in Mittel-Ost-Europa*, in: *Der Gipfel in München, Analysen aus dem Forschungsinstitut der Deutschen Gesellschaft für auswärtige Politik*, Bonn 1992, pp. 44/45.

²⁸ *Izvestija*, 7.7.1995.

²⁹ Cf. A. Troizkij, *op. cit.*, p. 33; *Finansovye Izvestija*, 25.5.1995.

³⁰ Cf. V.N. Parmon: *Netradicionnaja Energetika v Sibiri*, in: *Eko (Novosibirsk)*, No. 7/1994, p. 154 and p. 156 f.

Given the existing energy policy constraints of a dramatic fall in oil and coal production and stagnating gas extraction, Russia's energy policy-makers see no alternative but to continue to look to nuclear energy. This means that the existing plants will remain on stream despite poor safety standards and that the new power stations which are still under construction will be completed and put into operation. Any improvements elsewhere in the energy sector will take years to materialise, particularly as the entire energy infrastructure requires renewal and modernisation. The results of "living on one's capital", a principle which has been practised for decades, cannot be rectified in just a few years and certainly, as mentioned above, they cannot be corrected without outside assistance.

Nonetheless, further development of nuclear power is also expensive and time-consuming. In the past few years falling industrial production has eased the situation to a certain extent. However, should the Russian economy enter a growth phase once more, bottlenecks in the energy sector will increase. It is questionable whether Russia could then operate as an oil exporter and to what extent it could export natural gas. Although Western Europe will be supplied with oil and gas for as long as possible in order to obtain urgently needed foreign currency, there is no guarantee for this, and there is certainly none for Russia's former CMEA partners in Eastern Europe. Nuclear energy hardly presents a solution in this context.

Alternative Energies

We are left with the question of alternative energies such as geothermal energy, solar energy and wind energy. The use of geothermal energy is bound to local conditions, i.e. its availability. Any contribution to the energy mix will therefore be limited to a regional level. Transportation over long distances is hardly possible. Use is currently concentrated in the northern Caucasus and Kamchatka in particular, where thermal water and steam replace around 400,000 tonnes of coal equivalent. Siberia, however, where little exploration of this kind has so far taken place, is said to have even greater geothermal resources than Kamchatka. The utilisation of geothermal energy raises a number of ecological problems for which solutions have not yet been found.³⁰

Even in the Western industrialised countries, solar energy is not yet far enough developed for it to compete with conventional power stations. Moreover, it would present an alternative to other energies only

in the country's southern regions, but hardly in Siberia. Experts therefore give it little chance of success in Russia. Nonetheless, it is expected to increase its share of the country's electricity and heating supply in the long term.³¹

Wind energy will also be unable to make any significant contribution to the energy mix for the time being. Particularly in Siberia, however, there is great potential for wind energy. In southern West Siberia, on the banks of Lake Baikal, on the coast of the Arctic Ocean and in the Arctic itself, the wind reaches speeds of 5-10 metres/sec. and blows on 270-230 days a year. Above all else, however, the technical expertise required to commercially utilise this potential is not available. Russian units are far inferior to those of the industrialised countries as far as technical and economic performance is concerned. Moreover, the commercial life of such units is short in the harsh conditions of the northern climate. Particularly smaller wind-powered generation plants operate unreliably.³²

If they are to effect any real structural change in the Russian energy mix, all the alternative energies mentioned here will require such immense capital expenditure that from this point of view, too, they will be unable to make a significant contribution to the country's energy supply for a long time to come.

Energy Saving Potential

The only way of solving Russia's problems is by utilising the country's considerable energy saving potential. In order to do this, the most important requirement is to bring domestic prices for primary and secondary energies into line with world market prices. This also means introducing market prices for private households and is therefore unpopular. Until now, domestic prices for crude oil were at 26.6 per cent, for petrol at 31.2 per cent, for diesel fuel at 32.6 per cent, for heating oil at 23.9 per cent, and for gas at 30.3 per cent of world market prices (October 1994 figures).³³

During the privatisation of the national economy it ought to be possible to reduce the energy intensity of

production which is currently above world standards. Steering available investment resources towards the modernisation and improvement of existing plant, equipment and transport systems should prove more successful than investing in any expansion on the same technological level as before. The utilisation of waste heat which is currently emitted into the environment and which reaches temperatures of 100 to 150 degrees could save as much as 10 million tonnes of coal equivalent in Siberia alone.³⁴ Even though the energy saving potential is great (it is estimated at 500 million tonnes of coal equivalent for Russia as a whole, which in terms of calorific value corresponds to the country's entire annual crude oil and condensed gas production), its utilisation is dependent upon considerable financial investment which is not available. Not only in the energy sector is production plant in an almost indescribable condition (50-60 per cent of capacity is deemed "worn out"), in the energy-consuming industries, too, only 13 to 18 per cent are up to world standards.³⁵ This again means that extensive investment is needed if energy-saving effects are to be achieved.

In order to solve the energy sector crisis, a general change of attitude is required in a country where, until now, energy has cost next to nothing and nobody has felt responsible for anything. The form of industrial privatisation practised so far – i.e. the merely nominal transformation of state-owned enterprises into private companies without any change in management or ways of thinking – has in reality done nothing to alter prevailing conditions. However, the unwillingness of buyers to pay for primary and secondary energy and the related debt situation of almost every enterprise in the energy sector will scupper any efforts to improve the situation if there is no fundamental change in attitudes.

Under these conditions, any capital assistance from Western financial institutions (World Bank, IMF, European Bank for Reconstruction and Development) would not only be a waste of money because it cannot achieve anything, it would also delay the learning process in Russia which would rely on Western loans for survival as it has done time and again in the past. Withdrawing capital, on the other hand, would have an educational effect, forcing Russia to mobilise its own strengths and to adapt to the "civilised countries of the world" in this area too – a demand often voiced in these terms in the Russian press. All other avenues would result in Russia's economy remaining a bottomless pit for Western financial resources, yet without any recovery.

³¹ Ibid., p. 154 and p. 159.

³² Ibid., p. 157.

³³ Cf. P. Sergeev: *Degradacija energeticeskogo kompleksa Rossii*, in: *Voprosy Ekonomiki* (Moscow), No. 12/1994, p. 110.

³⁴ Cf. V.N. Parmon, *op. cit.*, p. 164.

³⁵ Cf. V. Vasilev, B. Davydov, A. Ljutenko, L. Chrilev, *op. cit.*, p. 7 f.